How Narcotics Traffickers Set Prices

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Wednesday, January 29, 2003

The topic of this panel is *How Narcotics Traffickers Set Prices* within the source and transit zones. A cautionary note is that I do not know the answer to the implicit question, or perhaps more accurately, I do not know much about the answer. In fact, I doubt that anyone knows a great deal about price setting, including agencies for which the answer would seem to be of special interest. Having made the confession, my focus will be on how we could *learn* the answer.

When posing and answering this question, it is useful to first posit an economic model of drug markets and draw inferences from that model. To be useful for this meeting, that model must be simple yet have implications that go beyond the trivial.

I will then put some meat on that model, citing findings from studies done at Abt Associates. Others, including researchers at this roundtable, have made significant contribution to understanding pricing behavior, but a general literature is beyond the scope of this paper. The Abt studies are illustrations, intended to show that well-crafted research can provide answers to questions about price setting.

I will close with comments about why we do not know more about pricing behavior.

Economics of Trafficking

Traffickers have multiple motives. Some seek profit and power; that is, their motivations are not much different from other businessmen, even if their methods are distinct. For others, the motivations are instrumental, principally to support political agendas including narcoterrorism. The commonality is that all traffickers seek to maximize profits while taking acceptable risks.

This term *profit* has different meaning for different people. As an economist might use the term, profit is the difference between revenues and costs. Revenues are the unit price earned for a product or service times the number of units transacted. Costs are the expenses incurred to sell or transfer the units. Those costs include monetary-equivalent imputations for risk and other nonpecuniary inputs into the trafficking process. Some clarification is in order.

First, profits are not equivalent to revenues. This fact is worth noting because discussions of drug markets sometimes conflate the two. For some purposes this conflation might be appropriate, but not when seeking to understand price setting. Second, as drugs get transported from source areas through transit zones and into arrival zones, they change hands but not necessarily ownership. That is, when trafficking heroin and cocaine,

transporters often provide services requiring that they neither buy nor sell drugs. Those traffickers charge for their services, of course, and those charges are a component of the eventual cost structure of drug trafficking. Third, subject to some constraints, a rational trafficker would seek to maximize the price his buyers pay for the product, minimize the price that he pays to purchase the product for resale, and minimize his own business expenses. There should be nothing especially objectionable about this sketch of the economics of drug trafficking. The question is: Does the sketch have any utility?

At What Price Can a Dealer Sell Drugs?

Table 1 describes three levels of a hypothetical drug distribution scheme: retail (level 1), wholesale (level 2), and higher-level transactions (level 3). Our concern is with prices set at level 3. This scheme represents a stylized distribution, but its simplicity will illustrate some points.

Table 1

	A Three-Level Drug Distribution System				
Level	number of buyers	units per buyer	price per unit	dealer cost	total revenue
1	N1	X1	P1		N1 X1 P1
2	N2	X2	P2	C2	N2 X2 P2
3	N3	X3	P3	C3	N3 X3 P3

There are N1 buyers at the street level, and each buys X1 units of drugs from a total of N2 retailers. Those retailers, in turn, buy X2 units each from a total of N3 wholesalers. Finally, those N3 wholesalers buy X3 units each from even higher-level dealers, who do not appear in the table. Assuming that no dealer keeps drugs for personal use and that there are no other leakages from the system: $X = N1 \cdot X1 = N2 \cdot X2 = N3 \cdot X3$; X is the total amount of drug that flows from one level to the next.

At the retail level, drug suppliers have a supply curve, consumers have a demand curve, and the retail price gets set so that what retail-level dealers are willing to sell is equivalent to what consumers are willing to buy. This scheme is the familiar supply and demand equilibrium of economics 101. Given the price at retail P1, total revenue from retail-level sales equals $R1 = N1 \cdot X1 \cdot P1$. Suppose that the cost from selling drugs at level 1 is C2 per dealer, where costs include compensation for risk and other expenses but exclude the cost of acquiring drugs for resale. Then the price that retailers pay to wholesalers must be such that:

$$N1 \cdot X1 \cdot P1 - N2 \cdot C2 - N2 \cdot X2 \cdot P2 = X(P1 - P2) - N2 \cdot C2 > 0.$$

That is, revenue must be greater than or equal to expenses; otherwise, retailers would not be in business. After some algebraic manipulation, this calculation places an upper limit on the price paid to the wholesaler such that:

$$P2 \leq P1 - C2/X2$$

If $P2 = P1 - C2/X2$, then the retail-level dealers make no profit as economists think of this term. They get compensated for their efforts, including the risks they take, but they get nothing beyond that compensation. If $P2 < P1 - C2/X2$, then street dealers make some profit, but this would only happen if they enjoy some monopoly power allowing them to negotiate effectively with wholesalers. The extent of monopoly power probably varies across street-level dealers, but assuming that the power is incomplete, we can make some fundamental observations:

- Wholesalers face what economists call a *derived demand curve*. In other words, when setting prices, wholesalers are affected by consumer demand for drugs because consumer demand motivates retailers to buy from wholesalers. If wholesalers have monopoly power, they would set the wholesale price (P2), and, in turn, set retail prices (P1), at a level that would maximize wholesaler profits. Otherwise P2 would settle at a level that would just cover the cost of doing business at the wholesale level.
- Wholesalers (especially those with monopoly power) prefer that street-level dealers minimize their own costs. Given that compensation for risk is probably the largest business cost, wholesalers would prefer to see street-level markets where risks–especially those resulting from violence and criminal justice sanctions—are minimized.
- Wholesalers (especially those with monopoly power) seek to minimize the monopoly power of retail-level dealers. Other things being equal, such wholesalers would like to see many retail-level dealers, so no single dealer could exert undue leverage when bargaining over price. There is an offsetting cost to maximizing the number of dealers in that the wholesalers' risks would presumably increase with retail-dealer exposure.

Moving to the next distribution level, N3 wholesalers each buy X3 units from higher-level dealers. What price can those upper-level dealers charge? By extension of the argument from above, the maximum price must be such that:

$$P3 \leq P2 - C3/X3 \leq P1 - C2/X2 - C3/X3$$

The implications are the same as before, but now they extend to upper-level dealers. Of course, if this story is true of a three-level distribution scheme, it should be equally true of a distribution scheme that has more than three levels. An extreme case may help cement the point. Suppose there were monopoly power at the source for cocaine in Colombia. Those Colombian monopolists would seek to oversee a distribution system that minimizes the costs of moving cocaine from Colombia to cocaine users in the United States. They would set their prices at a level such that, once all the distribution costs (including compensation for risk) were added to that monopolistic price, the resulting street price would maximize the differences between the total revenue earned on the street and the total costs to the entire distribution system. Given this simple model, the solution to the monopolist problem is familiar.

(1) Let X represent the aggregate amount of drugs sold by the monopoly (and hence at every distribution level), and let $P_R(X)$ represent the retail-level demand for drugs – that is, the price that consumer would pay if X amount of drugs were offered.

(2) Revenue to the monopolist is $P_R(X)X$ minus the sum of lower level distribution costs $\sum_{j=1}^{J-1} C_j(X)$ where there are J distribution levels, the Jth level is the monopolist, and the cost of selling X units at level j is a function $C_j(X)$ of the amount sold at level j.

(3) Profit to the monopolist is $P_R(X)X - \sum_{j=1}^{J} C_j(X)$.

(4) To maximize profits, the monopolist would set the marginal revenue from street sales equal to the sum of the marginal cost at each distribution level, so that:

$$\frac{\partial P_R(X)X}{\partial X} = \sum_{j=1}^{J} \frac{\partial C_j(X)}{\partial X}$$

Thus the monopolist determines the amount sold, X, that maximizes the distribution system's profits, all of which are absorbed by the monopolist. Given the demand curve, this determines the price on the street. Prices at the kth distribution level (lower than k=J) are just

$$P_K = P_R + \sum_{k=1}^{K} C_k(X)$$

This is the way that prices get set in the source area, in the transit zone, and elsewhere in the distribution scheme. There are a number of complications to this simple model, three of which need some attention here.

- The monopolist would require considerable information to implement this solution exactly. The model really serves to approximate what would happen when information is less than perfect and, in fact, departures from this solution might be considerable. Nevertheless as the monopolist acquires information, it would attempt to move prices and quantities in the direction implied here.
- Monopoly power does not have to occur at level J. A monopolist at a lower level would still choose the same P_K for every level below his level; prices above his level would be lower than is implied by this solution, allowing the monopolist to retain all the profits.
- Monopoly power may exist at more than one distribution level. Because a unique retail-level price will maximize the difference between revenue and cost, one solution would be for the vertically aligned monopolists to conspire to maximize joint profits and then agree to some mechanism (such as vertical integration) that would distribute those profits across partners. Without some such agreement, the

solution would be suboptimal from a system perspective, likely with higher prices and less drug sold. See Chiu, Mansley and Morgan (1997) who use a "double marginalization" model to suggest a solution.

- In the real world, drug distribution networks are not so neatly organized, and this model approximates a solution that, in reality, would have considerable noise.

Clearly we cannot jump to pricing at the source zone, or leap to the transit zone, or focus on the arrival zone and expect to provide a full picture of price setting at those levels. Even thought the supply and demand of drugs at low distribution levels is of peripheral interest to this roundtable, we cannot ignore it when attempting to answer the question of principal interest.

To answer the principal questions we need to understand:

- Consumer demand for drugs;
- Costs of supplying drugs at various distribution levels; and
- Market structures, especially monopolistic power;

The rest of this paper provides some thoughts on how we might learn about these matters.

Drug Prices and Revenues from Sales

Although there are critics (Manski, Pepper and Petrie, 2001), the science of estimating drug prices has advanced appreciably during the last decade (Rhodes, Johnston and Kling, 2001). Researchers typically report estimates as price per pure gram of drug exchanged. Can we tie price estimates into the economic model? Table 2 reports price estimates averaged over 1999 and the early part of 2000. Low-level purchases were about $150 per pure gram. Elsewhere, we have reported that estimated revenue from cocaine sales is about $35 billion (Rhodes et. al., 2001). Retail-level dealers do not retain all those earnings because retailers pay dealers at the next highest level about $95 per pure gram. This figure implies that retail-level dealers retain about $14 billion in earnings. This total is not all profit, as we know from the economic model, because a portion of revenue—perhaps all of it—covers the cost of doing business.

Table 2 --

Revenue from Cocaine Sales by Distribution Level

| Transaction Level	Price	Revenue	Retained Revenue	Laundered?
1 pure gram or less	$154.0	$35.0	$13.5	$0.0
1 to 10 pure grams	$94.4	$21.5	$10.3	$5.1
10 to 100 pure grams	$49.2	$11.2	$4.2	$4.2
100 to 500 pure grams	$30.6	$7.0	$1.4	$1.4
500 pure grams or more	$24.4	$5.5	$1.0	$1.0
At import?	$20.0	$4.5	$4.5	$4.5

Accepting these estimates as correct, we see that low-level dealers retain much of the revenue (about $14 billion), while much of the rest is retained at the next highest dealer level (about $10 billion). Almost $5 billion gets returned to importers. Most of the estimates provided in this paper are "back of the envelope." I intend them to illustrate the point that more careful and detailed analysis could answer questions about pricing structure.

Another observation pertains to a narrow, but nevertheless important, issue. The United States is concerned with money laundering, and the consensus seems to be that drug sales generate the majority of money laundering activity. Depending on how we define money laundering, we might assume that low-level dealers have no need to launder retained earnings ($14B). Assume that level 2 dealers launder half their funds ($5B) and higher-level dealers launder all their funds ($11B). Then total money laundering from cocaine sales amounts to about $16B, or somewhat less than half of all receipts from cocaine sales. Elsewhere we have estimated that *total* drug receipts are about $64 billion. If half that amount is laundered, then money laundering from drug sales amounts to about $32 billion.

Some additional speculation may be warranted. As best we can estimate, demand appears to have remained fairly stable over the last decade. Thus we would not expect to see changes in the differences between prices at the various distribution levels unless there were (1) changes in the costs of distributing cocaine or (2) changes in the distribution of monopoly power. In fact, figure 1 seems to show a modest decrease in the cocaine prices during the past decade, but beyond that there appears to be very little change in the way that dealers have set their prices. If there have been major changes in the industry cost structure, or if there have been major changes in the distribution of monopoly power, those changes do not appear in this figure.

[I have extracted most figures and some of the test from Abt reports. I lacked time to reformat those figures.]

Figure 1

**Five Levels of Cocaine Distribution, 1981 - 2001**
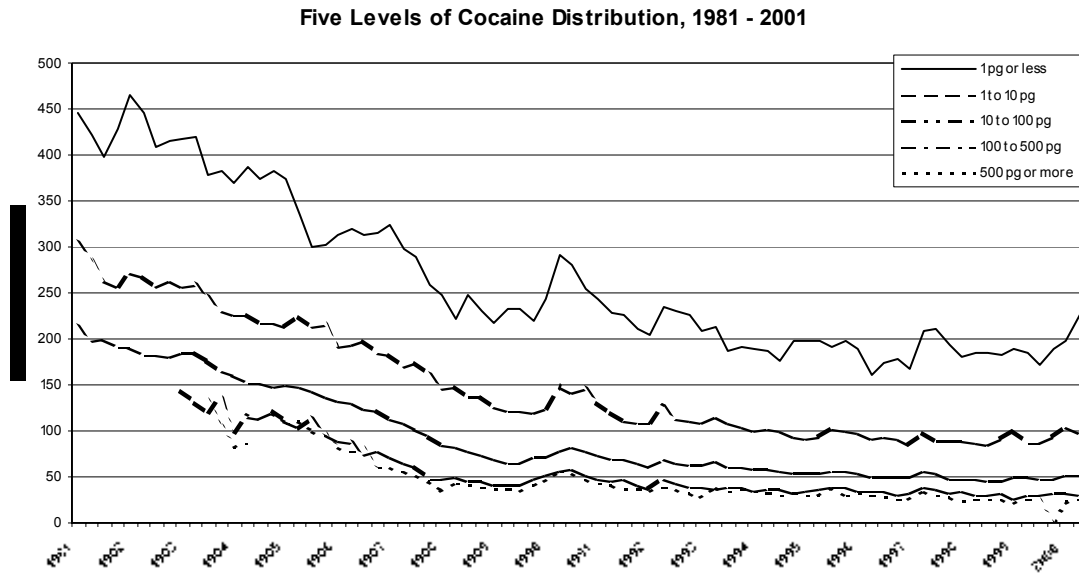
Looking at table 3, we can draw similar inferences about heroin. I am skeptical about the retail price estimates in figure 2. Putting that issue aside, we can estimate retained earnings and the extent of money laundering. Again, most of these earnings appear to be retained by lower-level dealers. Considerable uncertainty exists regarding border price; however, I have essentially guessed that it is about $80 per pure gram.

Table 3 --

Revenue from Heroin Sales by Distribution Level

Transaction Level	Price	Revenue	Retained Revenue	Laundered?
0.1 pure gram or less	$800.0	$10.0	$4.4	$0.0
0.1 to 1 pure grams	$447.4	$5.6	$1.9	$1.0
1 to 10 pure grams	$294.0	$3.7	$1.8	$1.8
10 to 100 pure grams	$147.0	$1.8	$0.5	$0.5
100 pure grams or more	$110.6	$1.4	$0.4	$0.4
At import?	$80.0	$1.0	$1.0	$1.0
				$4.6

Figure 2 shows trends in heroin prices. (N.B.: The lowest level prices shown in table 3 and figure 2 come from different sources; they are not the same.) Heroin and cocaine price trends differ in an important respect. Unlike the case for cocaine, the heroin market seems to have changed its pricing structure. Prices have fallen at all distribution levels, presumably because prices have fallen at the highest distribution level. Moreover, the absolute difference between prices at the middle levels seem to have narrowed. Something meaningful has apparently happened in the pricing structure for heroin markets.

Figure 2 --

Five Levels of Heroin Distribution, 1981 - 2001
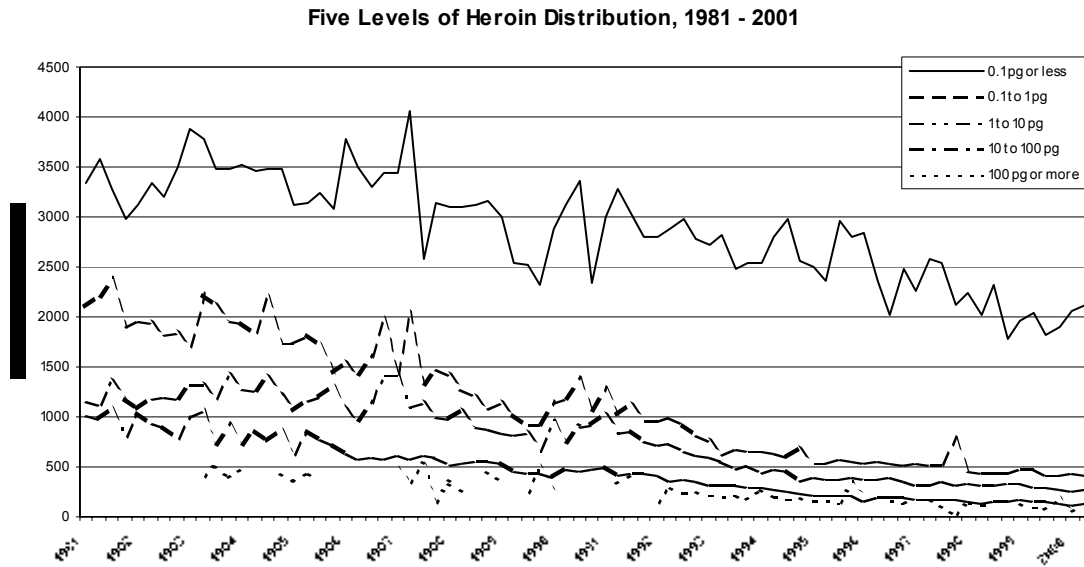
Another study provides some explanation for the above trends (Bruen et. al., 2002). Using several data sources, including the Heroin Signature Program, that study estimated the source area for heroin used in the United States. The pattern shown in figure 4 is clear: heroin from South America displaced heroin from Southeast and Southwest Asia as the principal source for heroin used in the United States. We cannot fully investigate the dynamics of that shift, but it seems that (1) Colombian suppliers could sell heroin at lower prices and (2) they may have manipulated middle-level markets to reduce the profit earned by middle-level dealers.
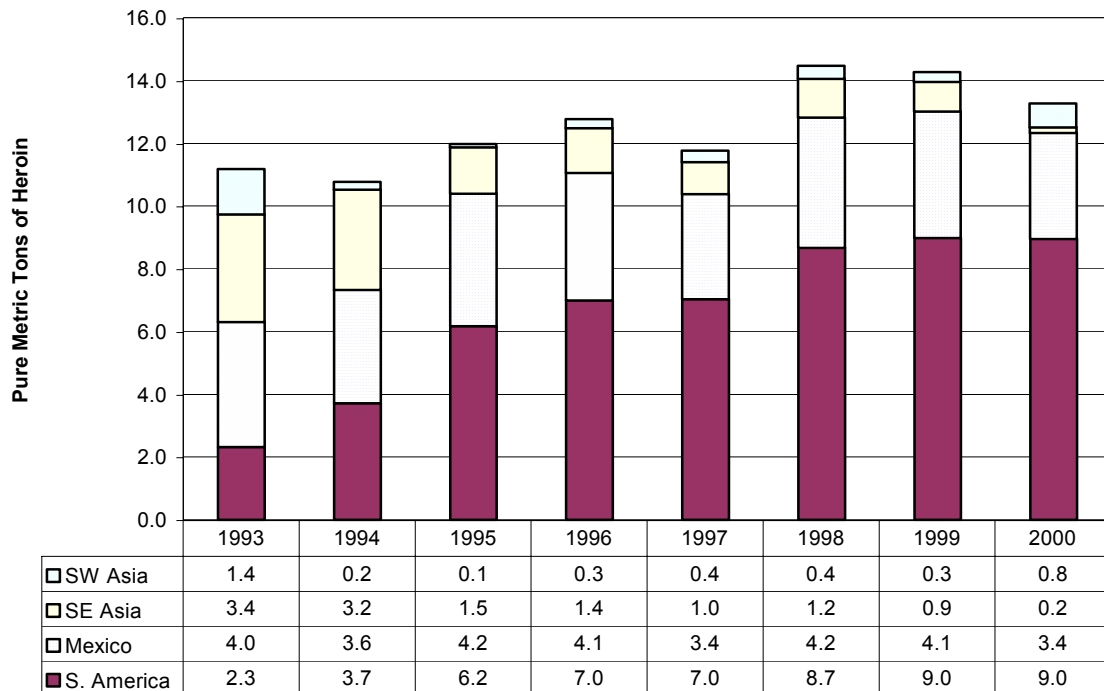
Figure 4

U.S. Consumption of Heroin by Source Area (CY 1993 through CY 2000)

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Figure 4

U.S. Consumption of Heroin by Source Area (CY 1993 through CY 2000)

	1993	1994	1995	1996	1997	1998	1999	2000
☐ SW Asia	1.4	0.2	0.1	0.3	0.4	0.4	0.3	0.8
☐ SE Asia	3.4	3.2	1.5	1.4	1.0	1.2	0.9	0.2
☐ Mexico	4.0	3.6	4.2	4.1	3.4	4.2	4.1	3.4
■ S. America	2.3	3.7	6.2	7.0	7.0	8.7	9.0	9.0

It is possible to be critical of every step in the causal and empirical linkage suggested above. Moreover, given time limitations, I have drawn statistics from diverse sources, and those statistics are not always consistently defined or measured. Being critical could miss the point, however. I do not pretend that any of the above estimates are correct, although I do believe that they are reasonable approximations. My real point is that we could derive science-based estimates that provide insight into the pricing behavior of drug distribution networks.

The explanations would be more useful if we could understand more about the organizations that sell drugs at the levels identified in the above tables and figures. We have attempted to do so for a study sponsored by the Financial Crime Enforcement Network. The U.S. Sentencing Commission could provide computerized data for defendants sentenced in Federal courts. These data come from pre-sentence investigation reports, which are based principally on DEA case files. The Commission could also provide pre-sentence investigation reports, which are filed in Washington, DC. The Commission refused our request for access. Another source is DEA investigation files. DEA refused our request for access. Curiously, we were able to interview drug traffickers, who were more cooperative than Federal agencies. Presumably a way exists

for researchers to gain access to case records, under suitable restrictions, so that the type of sketch developed above could be based on sounder empirical feet.

More About Pricing – Cost Factors

We can say something about factors that affect pricing in the source area and the trafficking zones. An Abt study (Layne, Rhodes, and Chester, 2000) provides an illustration. In that study, the U.S. Customs Service provided access to its Case Management System for Reports of Investigations (ROIs), a mostly textual, computerized file that included investigations of traffickers carrying drugs through the transit zone. We wrote a text-parsing program and extracted information about the method of conveyance, the area where the cocaine entered the United States, and the fee paid for transporting the drugs.

Table 4 summarizes the average fee data in terms of cost per kilogram delivered over the period 1989 to 1998. The table shows that transportation costs for the southwest border are much lower than elsewhere; perhaps because costs reported in ROIs for air and maritime conveyances represent the total cost from Colombia to the United States. However, reported costs for land conveyances are only partial costs, reflecting only the cost of moving cocaine across the border of Mexico or Canada into the United States. Taking that fact into account, these transportation costs were between 8 and 14 percent of the price at the border.

Table 4

Transportation Costs by Region and Conveyance ($ per kilogram): Average Over Years 1989-1998 Outliers Excluded

Area	Non Commercial Vehicle	Commercial Vehicle	Non Commercial Air	Commercial Air	Non Commercial Marine	Commercial Marine
Florida	-	-	2,914	3,001	2,852	3,040
SWB	393	1,214	2,070	3,647	2,588	3,913
Rest of U.S.	475	2,875	2,880	2,754	3,059	2,963

- indicates not applicable

Figure 3 shows the estimated relationship between Customs enforcement presence and the cost of transporting cocaine to the United States. All conveyance types–land, air and sea–are included in this analysis. The vertical axis displays the cost per kilogram transported. The graph shows that as enforcement presence increases, so do smuggler costs. The report suggested that over a ten-year period, the presence of Customs enforcement resources has increased smugglers' transportation fees by $0.372 for every $1.00 of Customs enforcement presence.

Figure 3 --
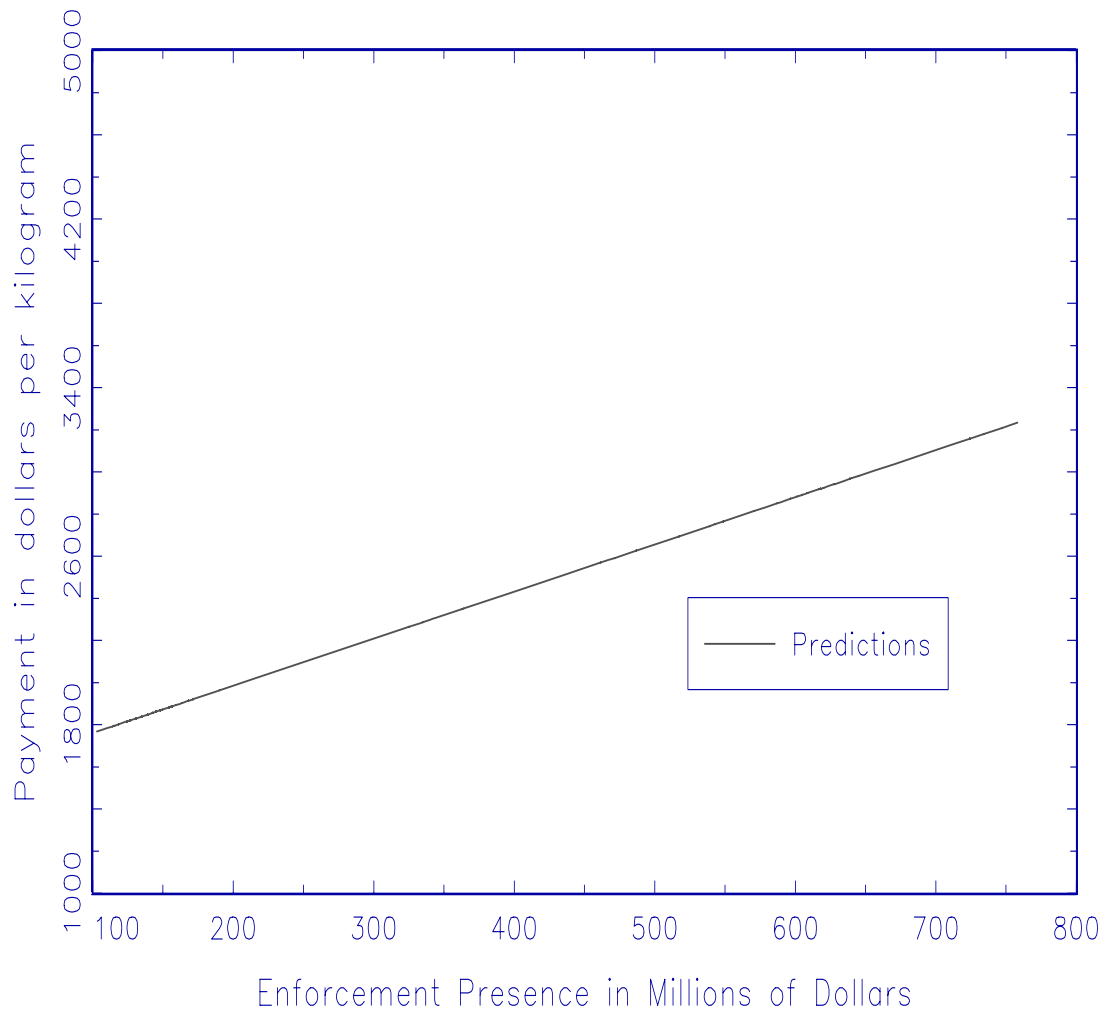
One should not take this estimate too seriously. This exercise was a proof-of-concept study, not a definitive attempt to estimate the effectiveness of Customs resources. Nevertheless, it shows that the transportation costs are an appreciable proportion of the border price for cocaine. It also seems to show that Customs interdiction resources, which were classified as enforcement personnel, aircraft, and inspection technologies, have an impact on trafficker's fees. This exercise seems like such a common sense way of evaluating the value of Customs' resources that one wonders why a more sophisticated form of this analysis is not a routine consideration by the U.S. Customs Service.

Another study done by Abt Associates (Layne et. al., 2001) attempted to measure the deterrent effect of enforcement operations on drug smuggling between 1991 and 1999. Part of that study investigated how deterrence events affected prices near the border and also prices at retail. It distinguished between national prices and prices at the Southwest Border. Prices were inferred from a special analysis of the STRIDE data. Deterrence events were identified as:

- Interdiction operations in source, transit, and arrival zones;
- Major adjustments to interdiction tactics (e.g., the implementation of a shoot-down/force down policy in Peru and Colombia);
- Investigative operations (e.g., Zorro II);
- The arrest and death of major drug dealers.

Using time-series analysis, the study found (abridged from the report):

Effects on National Wholesale Prices: Four deterrent events were found to have statistically significant effects on national wholesale prices of cocaine: Operation Support Justice III, Shoot Down, the arrest of the Orejuela brothers, and Operation Border/Gulf Shield. The effect of the two source zone interdictions, Support Justice III and Shoot Down was to increase wholesale prices by $3.53 per pure gram five to six months after initiation of the operation. The effect of Orejuela arrests was to increase wholesale prices by $4.71 in the month of the arrest, and the effect of long-active Border/Gulf Shield was to increase wholesale prices by $4.52 with a delay of two months.

National Retail Prices: The same deterrent events found to be significant in predicting national wholesale prices were similarly found significant in predicting national retail prices. The effect of the two source zone operations, Support Justice III and Shoot Down was to increase wholesale prices four and six months later by $30 per pure gram and $26 respectively. The effect of the Orejuela arrests was to increase wholesale prices by $33, and the effect of long active Border/Gulf Shield was to increase wholesale prices by $30. In both latter cases, the delay was by one month.

Southwest Border Wholesale Prices: The model indicates that wholesale prices at the South West Border were influenced by the three interdictions with the arrest of the Orejuela brothers having a dynamic effect[10] with no delay, and the two source zone interdictions having non-dynamic effects each with a five month delay. The effect of Support Justice III and Support Justice IV was to increase wholesale prices five months later by $5.47 per pure gram and $3.14 respectively. The effect of the Orejuela arrests was to increase wholesale prices by $3.84 in the month of the arrest, $2.66 the next month, and $1.86 the following month. Since the last Orejuela arrest was in August 1995, prices began an exponential decline towards their original level starting in September 1995.

South West Border Retail Prices The arrest or death of major Mexican drug traffickers (January 1996, February 1997, and July 1997) and Operation Conjuntos II (December 1998) were found to increase South West Border retail prices one month later by $68 and $95 respectively. These effects are represented in Figures 10 and 11 by spikes in the model at the appropriate months, and in three of the four cases, by coincident spikes in the data. The effect of Support Justice III was to increase wholesale prices by $59 four months after initiation of the operation, $34 in the next month, and $19 in the following month, approaching a total increase of $137. However, what is more evident from the figure is the subsequent exponential decline starting in September 1992. Operation Hard Line had a similar dynamic effect while it was in full operation. The initial increase in prices was about $6 approaching a total increase of $46, half of which would be achieved by the fifth month.

In a separate study, Johnston took a closer look at the linkage between the border price and the street-level price (Rhodes, Johnston and Kling, 2001) and his findings, while speculative, are enlightening. Johnston used sophisticated time-series techniques to study the relationship

between border prices and street-level prices. He reported findings suggesting the street prices increased with an increase in border prices, as would be expected. However, he also found that changes in border prices lagged behind changes in street prices, as if street prices affected border prices rather than border prices affecting street prices. He offered an explanation.

Johnston speculated that some interdiction events effectively prevent at least some shipments of cocaine from entering the United States, thereby creating a shortage. Importers do not react to those shortages, apparently because they honor contracted prices for delivery when they successfully ship a product and simply fail to deliver otherwise. However, street-level dealers react to a short-term shortage by increasing prices, which they keep high as long as the shortage persists. Eventually importers react to the shortage by negotiating contract with higher prices, giving the appearance that border prices lag behind street-prices. Of course, that is not the true causal order.

As was true of the cost-of-doing business study, one wonders why the federal government does not routinely perform studies intended to test whether or not major interdiction activities have had their intended effect on reducing the availability of drugs flowing through the transit zones.

How Good Are the Price Estimates?

Much of the story told above is only as good as the credibility of the price estimates. How precise are those price estimates? The National Academy of Sciences (Manski, Pepper and Petrie, 2001) has been critical of the data that have provided the basis for those estimates—the System to Retrieve Information from Drug Evidence (STRIDE)—and, by implication, their comments extend to data collected in support of the Heroin Signature Program. Some members of this roundtable have criticized the Academy's pessimistic view, but there is no dispute that STRIDE suffers from major deficiencies.

The methodology for developing the price estimates described in Figure 1 is described in detail elsewhere. Here we comment on how price estimates might be improved. There are at least three areas of improvement besides basic innovations to the underlying statistical analysis.

One problem—really the fundamental problem that prompted the Academy's blistering criticism—is that we cannot really know what STRIDE represents. STRIDE results from purchases made by federal agents, police in the District of Colombia, and a few other sources. We have no reason to presume that those agents and police select a representative sample of purchases, that is, we have no reason to suppose that drug samples in STRIDE represent what we would observe were we able to randomly sample purchases made by non-police buyers.

Although some samplers may think otherwise, one does not always have to have a random sample of items to learn about the means and distribution of those items in a population (for example, see Valliant, Dorfman and Royall, 2000). However, one does have to jump through some reasonably sophisticated statistical analysis where, in general, one estimates prices conditional on some variable X that is observed in the STRIDE data.

Then one adjusts the conditional estimates based on the distribution of X in the population. This procedure is the current estimation methodology. Under contract to DEA through ONDCP, my colleagues and I have recommended how this approach to estimation could be improved for heroin prices; those same improvements would apply for other illicit drugs.

One improvement would be to have the DEA collect additional information about the purchase: where it happened (indoors, outdoors, etc.), when it happened (morning, afternoon, evening, etc.), and other variables that are correlated with the price paid for illicit drugs. These variables would come from a checklist of about five questions that would be incorporated into the DEA Form 7, the form that always accompanies a sample sent to STRIDE. Then estimates from STRIDE would be made conditional on that full set of variables. Those same variables appear, by design, in the ADAM survey. Thus ADAM tells how those variables are distributed in the population. Combining ADAM and enhanced STRIDE data, therefore, would provide the means to improve the price series based on STRIDE. Although these and some additional recommendations were well received at the DEA, that agency has not yet taken steps to implement the recommendations.

In addition to samples that result from purchases for law enforcement purposes, the DEA also commissions quarterly purchases of heroin in twenty-two cities, the sole purpose being to record purity and eventually (through the Heroin Signature Program) the source area of the heroin. We also made common sense recommendations for improving that sample. The DEA currently make purchases of $100 per purchase. This price is far in excess of the $20 to $40 typically spent by users according to ADAM data. One recommendation is to have the DMP purchases more closely mimic purchases made by real-world consumers.

This is not the place to detail how price estimates could be improved. The purpose of the above discussion is to indicate that they can be improved through extant methodology. The question is not whether or not we can do it; they questions is whether or not anybody sees this improvement as being worthwhile.

Conclusions

The Nation's anti-drug efforts are often characterized as being demand-side or supply-side. Arguably a great deal of money is invested in demand-side research. An entire agency (the National Institute on Drug Abuse) is devoted to the scientific study of substance abuse. Other agencies focus on systematic data collection, data analysis, and policy analysis (Substance Abuse Mental Health Services Administration). There is no comparable agency supporting supply-side research; at least, there is no agency whose investment approaches a fraction of the investment made by NIDA and SAMHSA, a point by forcefully by the National Research Council. Why is this?

Perhaps demand-side policy lends itself to scientific study, while supply-side policy does not, but that is not apparent to me. I think the more credible explanation is that, for

whatever reasons, demand-side policy has developed a core of scientific researchers, both within government and outside government. Those scientists serve as advocates for more scientific study, and they provide the means by which those studies can get done. There is no counterpart on the supply-side. Excluding investment in high-tech equipment, the supply-side offers few advocates for science-based solutions. Lacking advocates, there is little scientific research. Lacking scientific research, there are few examples of how scientific research could inform public policy. Lacking examples of the usefulness of scientific research, there are few advocates. This is a cycle the nation is unlikely to break, an observation that apparently prompted the National Research Council to name their study *Informing America's Policy on Illegal Drugs: What We Don't Know Keeps Hurting Us*.

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